

Notice No.1

Rules and Regulations for the Classification of Naval Ships, January 2017

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: June 2017

Amendments to	Effective date	Mandatory Instrument
Volume 1, Part 1, Chapter 2, Sections 3 & 6	1 July 2017	NA
Volume 1, Part 3, Chapter 5, Sections 5 & 8	1 July 2017	NA
Volume 1, Part 3, Chapter 6, Section 6	1 July 2017	NA
Volume 1, Part 6, Chapter 1, Section 2	1 July 2017	NA
Volume 1, Part 6, Chapter 2, Section 3	1 July 2017	NA
Volume 1, Part 6, Chapter 6, Section 2	1 July 2017	NA

Volume 1, Part 1, Chapter 2

Classification Regulations

Section 3

Character of Classification and Class notations

3.5 Ship type notations

3.5.10 **LA**. This is a mandatory notation for all vessels that have lifting appliances fitted on board which are considered by LR to be essential for the vessel to fulfil its primary operational role, see Vol 1, Pt 1, Ch 2, 1.1 Framework of Classification 1.1.12. This notation will be assigned in association with a Register of Lifting Appliances listing the appliances covered, see Vol 1, Pt 1, Ch 2, 3.10 Other notations 3.10.3.

3.8 Military Distinction notations

Table 2.3.1 Hull, Military and Other Class Notations

Mandatory Notations		Other Notations		
Ship Type	Service Area	Hull Strength	Military Distinction ✱ MD	Others
See Vol 1, Pt 1, Ch 2, 3.5 Ship type notations (Select one:)	See Vol 1, Pt 1, Ch 2, 3.6 Service area notations (Select one:)	See Vol 1, Pt 1, Ch 2, 3.7 Hull strength notations	See Vol 1, Pt 1, Ch 2, 3.8 Military Distinction notations	See Vol 1, Pt 1, Ch 2, 3.10 Other notations
NS1	SA1 Service Area 1	ESA1 ESA2 Extreme Strength Assessment	IB1 IB2 Internal Air Blast	PCWBT Protective Coating in Water Ballast Tanks
NS2	SA2 Service Area 2	RSA1 RSA2 RSA3 Residual Strength Assessment	EB1 EB2 EB3 EB4 External Air Blast	ShipRight ACS (B) Anti-Corrosion System in Water Ballast Tanks ACS (V) Anti-Corrosion System in Void Spaces
NS3	SA3 Service Area 3	TLA Total Load Assessment	SH Shock Enhancement	*IWS In-water Survey
NSA(SR) NS(SSC)	SA4 Service Area 4	SDA Structural Design Assessment	WH1 WH2 WH3 Whipping Assessment	SMS Safety Management System
Description of ship's role Examples:	SAR Service Area Restricted	FDA Fatigue Design Assessment	FP1 FP2 Fragmentation Protection	LAP Lifting Appliances LAC Certified Lifting Appliances
Cruiser Helicopter Carrier			SP Small Arms Protection	TA1 TA2 TA3 TA(S) Towing Arrangements
Aircraft Carrier Destroyer				SD Special Duties
Frigate Corvette				CM Construction Monitoring
Amphibious Assault Ship Amphibious Transport Dock				SEA (HSS-n) Ship Event Analysis Hull Surveillance System
Landing Craft Minehunter Minelayer Mine-sweeper				SEA (VDR) Ship Event Analysis Voyage Data Recorder
Patrol Ship Survey Ship e.g. NS1 Helicopter Carrier				SEA (VDR-n) Ship Event Analysis Voyage Data Recorder (strain gauges)
Oil Supply Ship Landing Ship Dock				ES Enhanced Scantlings
Survey Ship Stores Replenishment Ship Transport Dock				SERS Ship Emergency Response Service

Ro-Ro Ship Troop Carrier Vehicle Carrier Air Cushioned Support Military Operations AIR Aircraft Operations LA Lifting Appliances				EER Escape, Emergency Access, Evacuation and Rescue (see Notes 1 & 2) FIRE Fire Protection (see Notes 1 & 2) LSAE Life Saving and Evacuation (see Notes 1 & 2) ESC Escape and Emergency Access(see Notes 1 & 2) SNC Safety of Navigation and Communication (see Note 1) POL Pollution Prevention Ice Class Navigation in Ice LMA Manoeuvring Assessment CEPAC Crew and Embarked Personnel Comfort EPENV Environmental Protection LI Approved Loading Instrument HPMS Hull Planned Maintenance Scheme LE Lifting Eyes STAB Buoyancy, Stability and Controllability Assessment
Note 1. Star Endorsement (*) may be assigned to this notation where the arrangements on board are in accordance with stated National Administration requirements.				
Note 2. Double Star Endorsement (**) may be assigned to this notation where the arrangements on board are in accordance with the requirements of ANEP-77 NATO Naval Ship Code (NSC).				

3.10 Other notations

Existing paragraph 3.10.1 has been deleted.

3.10.1 LAP. This optional notation will be assigned to naval ships in respect of the lifting appliances fitted which are classed in accordance with LR's *Code for Lifting Appliances in a Marine Environment, July 2016 incorporating Notice No. 1 & 2* or equivalent standard, but where it is not mandated by the LA notation, see *Vol 1, Pt 1, Ch 2, 1.1 Framework of Classification 1.1.12*. This notation will be assigned in association with a Register of Lifting Appliances listing the appliances covered, see *Vol 1, Pt 1, Ch 2, 3.10 Other notations 3.10.3*.

3.10.2 LAC. This notation will be assigned to naval ships where the prescribed periodical surveys for certified lifting appliances are undertaken by Lloyd's Register at the request of the Owner. This notation will be assigned in association with a Register of Lifting Appliances listing the appliances covered, see *Vol 1, Pt 1, Ch 2, 3.10 Other notations 3.10.3*.

3.10.3 A Register of Lifting Appliances is to be maintained for all classed and certified lifting appliances, including, where fitted:

- Bow, side and stern doors serving as ramps and/or serving to provide watertight integrity of the ship.
- Vehicle ramps.
- Movable decks.
- Personnel Lifts
- Stores lifts.
- Mechanized cargo handling systems
- Cranes.
- Davits.
- Overboard recovery davits
- Replenishment at sea equipment.
- Engineers lifting arrangements.

- (l) Eye plates and securing devices exceeding 2,5 tonnes
- (m) Miscellaneous lifting arrangements.
- (n) Towed body attachments.

Lifting Appliances for handling explosives stores or munitions can be brought within the scope of the **LAP** (or **LA**) notation but the *Code for Lifting Appliances in a Marine Environment, July 2016, incorporating Notice No. 1 & 2* will need to be augmented with Naval Administration requirements.

Maintenance of the Register of Lifting Appliances is the responsibility of the Owner and should include all classed and certified lifting appliances. The **LA**, **LAP** and/or **LAC** notations will be retained so long as the appliances are found upon examination by LR at the prescribed surveys to be maintained in accordance with the standard.

~~3.10.23~~ **3.10.4 LE**. This notation will be assigned where the lifting eyes, with a permissible loading of 2,5 tonnes or less, installed for the purpose of shipping and unshipping equipment and machinery, and which do not form part of a lifting appliance, are of an approved design, tested during construction and inspected through life in compliance with the requirements of *Vol 1, Pt 3, 4, 11 Lifting eyes*.

Existing paragraphs 3.10.2 to 3.10.4 have been renumbered 3.10.5 to 3.10.7.

~~3.10.5~~ **ES Enhanced Scantlings**. Available where scantlings in excess of the approved Rule minimum requirements are fitted at defined locations. For example, the note **ES+1** will indicate that an extra 1 mm has been fitted to the hull envelope plating (i.e. deck, side and bottom).

Existing paragraphs 3.10.6 to 3.10.22 have been renumbered 3.10.8 to 3.10.24.

~~3.10.20~~ **3.10.22 ShipRight ACS (B)**. This notation will be assigned to Naval vessels ships, at the Owner's request, when protective coating systems have been applied to water ballast tanks during construction in accordance with the *ShipRight Anti-Corrosion Notations for Naval Ships* procedure. The ACS() notation, with the extension of one or more of the following associated supplementary characters shown in brackets, detailing the specified protected area or areas, may be assigned as follows:

B	Water Ballast Tanks
V	Void Spaces

Existing paragraph 3.10.24 have been renumbered 3.10.25.

■ Section 6

Classification of machinery with [✕]LMC or MCH notation

6.3 Survey and inspection

(Part only shown)

6.3.3 Acceptance of manufacturer's certificates for items of machinery for propulsion (including propulsion gearing with single input/output arrangements) and for electrical power generation and for other auxiliary machinery for essential services where the [✕]LMC notation is to be assigned, is subject to the following conditions:

- (a) The vessel is an NS3 ship, or an NSA NS(SR) ship, or an NS(SSC) ship of less than 500 gross tonnage or is a ship of 500 gross tonnage or greater and is not required to comply with international conventions applicable to a ship with unrestricted service.

(Part only shown)

6.3.4 Acceptance of the manufacturer's certificate for propelling and essential auxiliary machinery, where the MCH notation is to be assigned, is subject to the following conditions:

- (a) The vessel is an NS3 ship, or an NSA NS(SR) ship, or an NS(SSC) ship of less than 500 gross tonnage or is a ship of 500 gross tonnage or greater and is not required to comply with international conventions applicable to a ship with unrestricted service.

Volume 1, Part 3, Chapter 5

Anchoring, Mooring, Towing, Berthing, Launching, Recovery and Docking

■ Section 5

Anchor cable

5.5 Cable stopping and release arrangements

5.5.1 It is recommended that suitable bow chain stoppers be provided. Where cables pass through stoppers, these stoppers are to be manufactured from ductile material and be designed to minimise the possibility of damage to, or snagging of, the cable. They are to be capable of withstanding without permanent deformation a load equal to 80 per cent of the Rule breaking load of the cable passing over them. The corresponding stresses induced in the supporting structure are not to exceed the allowable values given in *Table 5.5.1 Allowable stresses in windlass and chain stopper supporting structure*.

Table 5.5.1 Allowable stresses in windlass and chain stopper supporting structure

	Permissible stress N/mm ²
Normal stress (see Note 1)	1,00 σ_0
Shear stress	0,58 σ_0
Symbols	
σ_0 = specified minimum yield stress, N/mm ²	
Note 1 Normal stress is defined as the sum of bending and axial stresses.	

■ Section 8

Windlass and capstan design and testing

8.2 Windlass design

8.2.1 The following performance criteria are to be used as a design basis for the windlass:

- (a) (b) The windlass is to have sufficient power to exert, over a period of at least two minutes, a pull equal to the greater of:
- (i) short term pull: 1,5 times the continuous duty pull as defined in *Vol 1, Pt 3, Ch 5, 8.2 Windlass design 8.2.1(a)*;
 - (ii) anchor breakout pull:

$$12,18W_a + \frac{7,0L_c d_c^2}{100} \text{ N}$$

where

L_c is the total length of chain cable on board, in metres, as given by *Table 5.4.1 Equipment - HHP Bower anchors and chain cables*

W_a is the mass of bower anchor (kg) as given in *Table 5.4.1 Equipment - HHP Bower anchors and chain cables*.

- (b) (c) ~~In the absence of a chain stopper, the windlass, with its braking system in action and in conditions simulating those likely to occur in service, is to be able to withstand, without permanent deformation or brake slip, a load, applied to the cable, given by:~~
The windlass, with its braking system in action and in conditions simulating those likely to occur in service, is to be able to withstand, without permanent deformation or brake slip, a load, applied to the cable, given by:

$$K_b d_c^2 (44 - 0,08d_c) \text{ N}$$

where

K_b is given in *Table 5.8.1 Values of K_b*

Where a chain stopper is fitted, the windlass braking system is only to ensure safe stopping when paying out the anchor and chain. It is the Master's responsibility to ensure that the chain stopper is in use when riding at anchor. At clearly visible locations on the bridge and adjacent to the windlass control position the following notice is to be displayed:

"The brake is rated to permit controlled descent of the anchor and chain only. The chain stopper is to be used at all times whilst riding at anchor."

The performance criteria are to be verified by means of shop tests in the case of windlasses manufactured on an individual basis. Windlasses manufactured under LR's Type Approval Scheme for Marine Engineering Equipment will not require shop testing on an individual basis.

- (c) ~~Where a chain stopper is fitted, the windlass braking system is to have sufficient brake capacity to ensure safe stopping when paying out the anchor and chain. It is the Master's responsibility to ensure that the chain stopper is in use when riding at anchor. At clearly visible locations on the bridge and adjacent to the windlass control position the following notice is to be displayed:~~
"The brake is rated to permit controlled descent of the anchor and chain only.
The chain stopper is to be used at all times whilst riding at anchor."

Table 5.8.2 Design load cases for the windlass

Load case	Condition	Note
1	Continuous pull	See Vol 1, Pt 3, Ch 5, 8.2 Windlass design 8.2.1(a)
2	Overload pull	See Vol 1, Pt 3, Ch 5, 8.2 Windlass design 8.2.1(b)
3	Brake holding load	See Vol 1, Pt 3, Ch 5, 8.2 Windlass design 8.2.1(b)(c)

8.8 Seatings

8.8.1 The windlass is to be efficiently bedded and secured to the deck. The thickness of the deck in way of the windlass is to be increased, and ~~adequate stiffening is to be provided, to the Surveyor's satisfaction.~~ the supporting structure for the anchor windlass should be examined for the brake holding loads specified by *Table 5.8.2 Design load cases for the windlass*. The allowable stresses specified in *Table 5.5.1 Allowable stresses in windlass and chain stopper supporting structure* are to be used to derive the net scantlings of the supporting structure. The structural design integrity of the bedplate is the responsibility of the Builder and windlass manufacturer.

8.9 Structural requirements for windlasses on exposed fore decks

8.9.1 Windlasses located on the exposed deck over the forward $0,25L_R$ of the Rule length, of naval ships of sea-going service of length 80 m or more, where the height of the exposed deck in way of the item is less than $0,1L_R$ or 22 m above the summer load waterline, whichever is the lesser, are to comply with the following requirements. Where mooring winches are integral with the anchor windlass, they are to be considered as part of the windlass.

8.9.2 The following pressures and associated areas are to be applied, see *Figure 5.8.1 Windlass loading*:

- 200 kN/m² normal to the shaft axis and away from the forward perpendicular, over the projected area in this direction;
- 150 kN/m² parallel to the shaft axis and acting both inboard and outboard separately, over the multiple of times the projected area in this direction;

where

$f = 1 + B/H$, but not greater than 2,5

B = width of windlass measured parallel to the shaft axis, in metres

H = overall height of windlass, in metres.

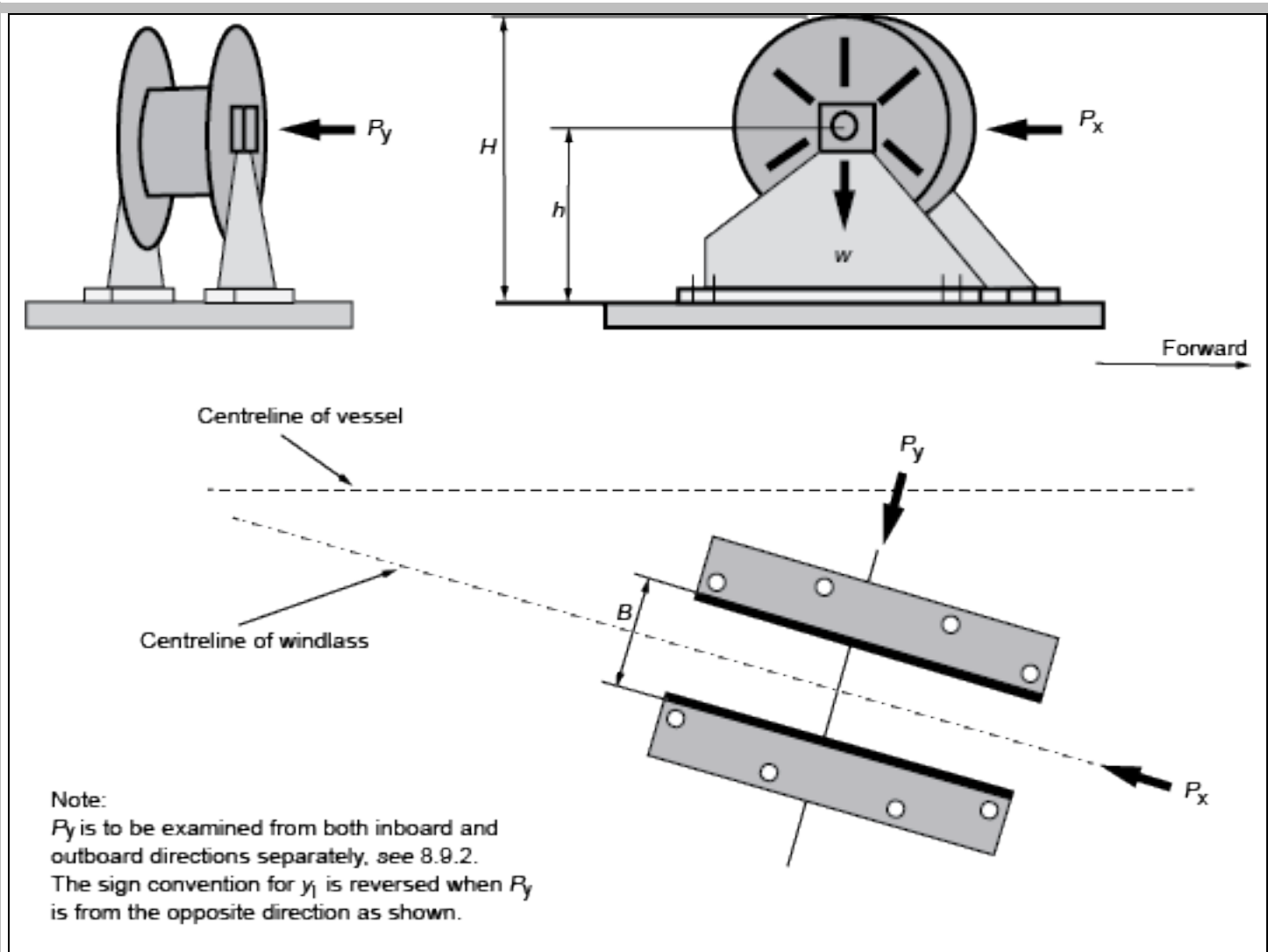


Figure 5.8.1 Windlass loading

8.9.3 Forces in the bolts, chocks and stoppers securing the windlass to the deck are to be calculated. The windlass is supported by N bolt groups, each containing one or more bolts, see Figure 5.8.2 Direction of forces and weight.

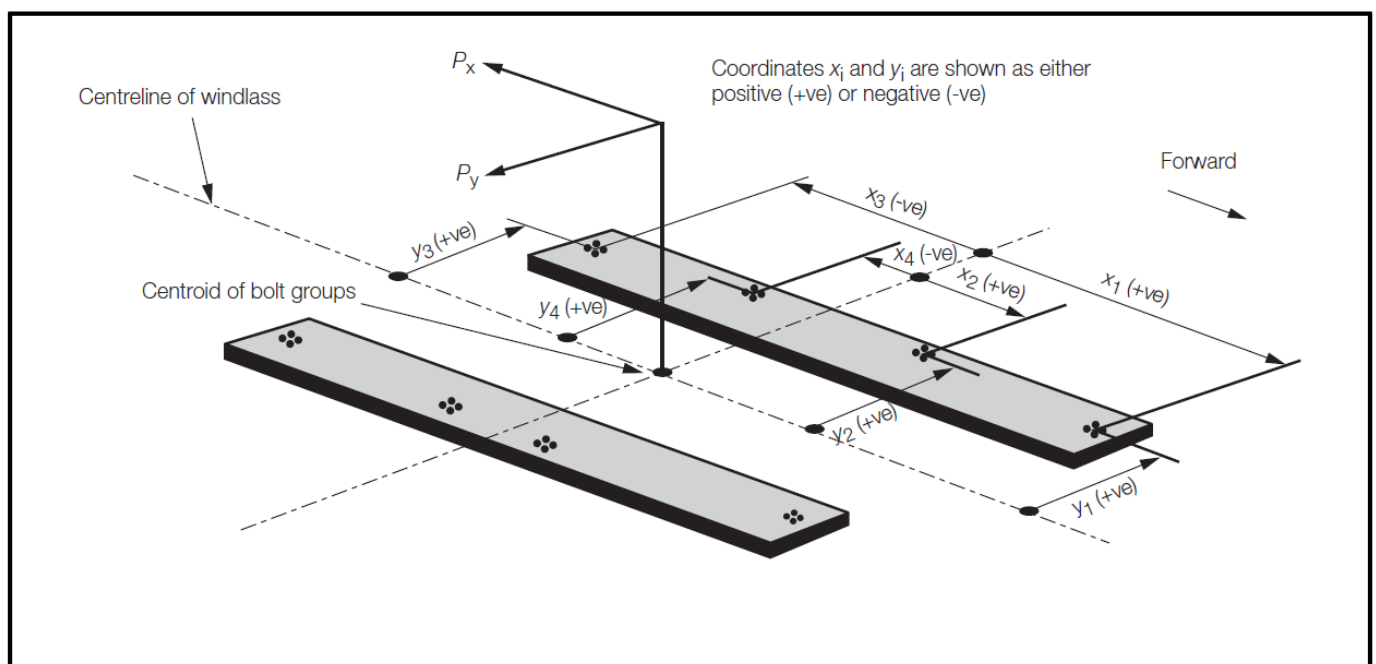


Figure 5.8.2 Direction of forces and weight

8.9.4 The axial force R_i in bolt group (or bolt) i , positive in tension, may be calculated from:

$$R_{xi} = P_x h x_i A_i / I_x \text{ in kN}$$

$$R_{yi} = P_y h y_i A_i / I_y \text{ in kN, and}$$

$$R_i = R_{xi} + R_{yi} - R_{si} \text{ in kN}$$

where

P_x = force acting normal to the shaft axis, in kN

P_y = force acting parallel to the shaft axis, either inboard or outboard whichever gives the greater force in bolt group i , in kN

h = shaft height above the windlass mounting, in cm

x_i, y_i = x and y coordinates of bolt group i from the centroid of all N bolt groups, positive in the direction opposite to that of the applied force, in cm

A_i = cross-sectional area of all bolts in group i , in cm^2

$$I_x = \sum A_i x_i^2, \text{ for } N \text{ bolt groups, in } \text{cm}^4$$

$$I_y = \sum A_i y_i^2, \text{ for } N \text{ bolt groups, in } \text{cm}^4$$

R_{si} = static reaction at bolt group i , due to weight of windlass, in kN.

8.9.5 Shear forces F_{xi}, F_{yi} applied to the bolt group i , and the resultant combined force F_i may be calculated from:

$$F_{xi} = (P_x - \mu g M) / N \text{ in kN}$$

$$F_{yi} = (P_y - \mu g M) / N \text{ in kN}$$

and

$$F_i = \sqrt{F_{xi}^2 + F_{yi}^2} \text{ kN}$$

where

μ = coefficient of friction (0,5)

M = mass of windlass, in tonnes

g = gravity acceleration ($9,81 \text{ m/sec}^2$)

N = number of bolt groups.

8.9.6 Tensile axial stresses in the individual bolts in each bolt group i are to be calculated. The horizontal forces F_{xi} and F_{yi} are normally to be reacted by shear chocks. Where 'fitted' bolts are designed to support these shear forces in one or both directions, the von Mises equivalent stresses in the individual bolts are to be calculated, and compared to the stress under proof load. Where pourable resins are incorporated in the holding down arrangements, due account is to be taken in the calculations.

8.9.7 The safety factor against bolt proof strength is to be not less than 2,0.

8.9.8 Bolts are to be of ISO 898/1 material Grade 8.8, 10.9 or 12.9 or equivalent and are to be pretensioned by controlled means to 70 to 90 per cent of their yield stress. Pretensioning is to be in accordance with the manufacturer's instructions and, in general, pretensioning by bolt torquing up to bolt size M30 may be used. Beyond this, pretensioning is to be carried out by an hydraulic tensioning device and the elongation of the bolts measured to determine pre-load. Where resin chocks are proposed, plans and calculations are to be submitted for consideration.

8.9.9 The windlass is to be efficiently bedded and secured to the deck. The thickness of the deck in way of the windlass is to be increased. Adequate stiffening of the deck in way of the windlass is to be provided. The scantlings of the supporting structure and deck are to be determined by additional calculations applying the weight of the windlass combined with the resultant force on the seat due to the application of the following design loads:

- P_x (as defined in Vol 1, Pt 3, Ch 5, 8.9 Structural requirements for windlasses on exposed fore decks 8.9.4);
- P_y ;
- P_x and P_y combined;

The allowable stresses given in Table 5.8.4 Allowable stress in windlass supporting structure for green sea loading are not to be exceeded.

Table 5.8.4 Allowable stress in windlass supporting structure for green sea loading

	Bending stress, in N/mm^2	Shear stress, in N/mm^2	Combined Stress, in N/mm^2
Allowable Stress	$0,64 \sigma_0$	$0,37 \sigma_0$	$0,9 \sigma_0$
σ_0 = specified minimum yield stress in N/mm^2			

8.9.10 The axial tensile and compressive forces in Vol 1, Pt 3, Ch 5, 8.9 Structural requirements for windlasses on exposed fore decks 8.9.4 and the lateral forces in Vol 1, Pt 3, Ch 5, 8.9 Structural requirements for windlasses on exposed fore decks 8.9.5 are also to be considered in the design of the supporting structure.

Volume 1, Part 3, Chapter 6

Structural Procedures for the Design, Construction and Lifetime Care of Ships

■ *Section 6* **Enhanced scantlings**

6.1 Enhanced Scantlings

~~6.1.1 Where scantlings in excess of the approved Rule requirement are fitted at defined locations as a corrosion margin or for other purposes as specified by the Owner, a notation, **ES**, 'Enhanced Scantlings', will be assigned. It will be accompanied by a list giving items to which the enhancement has been applied and the increase in scantling. For example, the item 'bottom shell (strakes A, B, C, D) + 2' will indicate that an extra 2 mm has been fitted to the bottom shell of the ship for the particular strakes listed, see also Vol 1, Pt 6, Ch 6, 2.10 Corrosion margin. In addition, the plans submitted for approval are to contain the enhanced scantling, together with the nominal thickness less the enhancement, adjacent and in brackets.~~

Existing Sections 7 to 9 have been renumbered 6 to 8.

Volume 1, Part 6, Chapter 1 General

■ Section 2 General requirements

2.5 Enhanced scantlings

2.5.1 Where scantlings in excess of the approved Rule requirement are fitted at defined locations as corrosion margins or for other purposes, a notation **ES**, 'Enhanced Scantlings', will be assigned and it will be accompanied by a list giving items to which the enhancement has been applied and the increase in scantling. For example, the item 'bottom shell (strakes A, B, C, D)+2' will indicate that an extra 2 mm has been fitted to the bottom shell of the ship for the particular strakes listed, see also Vol 1, Pt 6, Ch 6, 2.10 Corrosion margin. In addition the plans submitted for approval are to contain the enhanced scantling plan, together with the nominal thickness, less the enhancement adjacent, in brackets. See also Vol 1, Pt 6, Ch 6, 2.10 Corrosion margin.

Volume 1, Part 6, Chapter 2 Design Tools

■ Section 3 Buckling

3.1 General

3.1.4 The buckling requirements are to be met using the net scantlings, hence any additional thickness for corrosion margin or enhanced scantlings is not included in the scantlings used to assess the buckling performance. For enhanced scantlings, see Vol 1, Pt 3, Ch 6, 6 Enhanced Scantlings. For corrosion margins, see Vol 1, Pt 6, Ch 6, 2.10 Corrosion margin.

Volume 1, Part 6, Chapter 6 Material and Welding Requirements

■ Section 2 Materials

2.6 Paints and coatings

2.6.2 At the Owner's request, the **ShipRight ACS (B)** and/or **ACS(V)** notation may be assigned to a vessel to indicate that paints and protective coatings have been applied to water ballast tanks or void spaces in accordance with the *ShipRight Anti-Corrosion System Notations for Naval Ships* procedure during construction, see Vol 1, Pt 1, Ch 2, 3.10 Other notations.

2.6.5 Details and recommendations regarding the coating of salt-water ballast spaces are given in LR's *List of Paints, Resins, Reinforcements and Associated Materials* and the *ShipRight Anti-Corrosion System Notation for Naval Ships* procedure.

2.10 Corrosion margin

2.10.3 For naval auxiliaries-vessels with scantlings in accordance with either the *Rules and Regulations for the Classification of Ships (NSA)* **NS(SR)** or the *Rules and Regulations for the Classification of Special Service Craft* **NS(SSC)** the corrosion margins, where specified in those Rules, are to be applied.

2.10.6 Ships with an Owner specified corrosion margin will be eligible for an enhanced scantling notation, see Vol 1, Pt 3, Ch 6, 6 Enhanced Scantlings

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